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**Biogeosciences Discussions**

# *Interactive comment on* "A culture-based calibration of benthic foraminiferal paleotemperature proxies: $\delta^{18}$O and Mg/Ca results" *by* H. L. Filipsson et al.

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We thank both reviewers for their constructive comments and positive feed back. Both reviewers suggest minor revisions. We here address only the major points; we have followed most of their suggestions regarding grammar and technical details and feel no need to discuss those further.

Reviewer 2,

Specific comments R2: - Introduction, page 352, lines 15-26: you should add a few selected references of important studies here. –



Reply: We agree with the reviewer and have included some more references in the introduction

R2: Methods, page 354, last paragraph: why do you not refer to Cibicidoides and Uvigerina on the species level? Although these genera do not play a significant role in your study, stable isotope measurements on tests collected during field studies show significant inter-specific variability.

Reply: We did not identify the Cibicidoides and Uvigerina specimens to the species level because these species did not reproduce and are not central to our study.

R2: Methods, page 356, lines 21-26: while the culturing procedures and Mg/Ca measurements are extensively described, you refer to an internet source concerning the precision of the mass spectrometer used for the stable oxygen isotope measurements. At least the precision of the used instrument should be provided in the manuscript.

Reply: We included a short paragraph about the precision.

R2 - Results, page 359, lines 8-9: why are you assuming that most calcification occurred in the final months of the experiment (referring to the study of McCorkle et al., 2008)? Since the timing of calcification is important in the interpretation of results, you should shortly summarize the reasons for your assumption.

Reply: Please see previous response to reviewer 1 and also note that the two sets of averages were not significantly different – i.e., this will not alter any of our conclusions

R2- Discussion, page 363, lines 4-14 and Figure 4: Your data reveal a clear onthogenetic trend in the _18O of B. aculeata / B. marginata. The larger tests seem to exhibit more scattering at higher culturing temperatures. At 7_C culturing temperature, this taxon reveals a linear onthogenetic trend. Similar results have been obtained by the study of Barras et al. (2010). I cannot see an asymptotic approach to a maximum isotope composition in B. aculeata / B. marginata as reported in previous studies and for other taxa (Schmiedl et al., 2004; McCorkle et al., 2008). I recommend addressing

this difference (and the potential reasons for it) in the discussion chapter in a bit more detail.

Reply: We kept this discussion rather short since we are aware of the limited observation points especially for the 7 deg setting. We do think that there is a trend also in the 7 deg data set, however, the data set is too small either require or rule out either a linear increase, or asymptotic approach. However there seems to be a tendency for larger /older specimens to approach equilibrium. We added a paragraph about this in the discussion.

R2 - Discussion, page 366, lines 1-5: Are there any observations on onthogenetic effects in the Mg/Ca values of cultured planktonic foraminifers that could support your interpretation? If so, you may add this here.

Reply: The studies, we are aware of, on planktonic foraminifera, Mg/Ca, and ontogeny focus mostly on calcification and dissolution in different environments (surface water vs subsurface) (Rosenthal et al., 2000). As it is now we think it would be very difficult to compare the results (planktonic vs benthic) since so many factors vary between the two forms and it would also shift the focus of the paper.

Rosenthal, Y., Lohmann, G.P., Lohmann, K.C. and Sherrell, R.M., 2000. Incorporation and preservation of Mg in Globigerinoides sacculifer: Implications for reconstructing the temperature and 18O/16O of seawater. Paleoceanography, 15(1): 135-145.

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